

Coronary patient—early treatment?

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There are some 150 000 deaths from coronary heart disease in the United Kingdom each year: 55 000 of these occur in people aged less than 70 years; approximately two-thirds take place outside hospital. The majority are sudden in that they happen within one hour of the onset of symptoms.

Nine out of every 10 early deaths from coronary artery disease are the result of ventricular fibrillation. Both clinical and experimental evidence indicates that after coronary occlusion the magnitude of the infarct is likely to be determined within the first few hours and may be influenced in a salutary way by early therapeutic intervention. The objectives therefore of prehospital coronary care are to attack the problem of sudden death outside hospital and to provide treatment for the patient with acute myocardial infarction at the earliest possible moment after the onset of symptoms.

In 1975 a Working Party of the Royal College of Physicians of London and the British Cardiac Society¹ stated that, "The Department of Health and Social Security (DHSS) and the Scottish Home and Health Department should actively encourage the development of mobile coronary care. . . . Doctor-manned mobile coronary care units should be developed wherever possible. In areas where this is not practicable a service manned by trained ambulancemen or other paramedical personnel should be developed. . . . A more positive approach to the problems of sudden unexpected death and to the high mortality in the first hours after a heart attack is necessary. More attention must be paid to the organisation of emergency medical services, including the provision of immediate coronary care. . . . Widespread instruction of the public in resuscitation should be encouraged as a further means of rescuing victims stricken by acute heart attacks. Such instruction could be carried out by trained laymen or medical personnel in schools, factories and large institutions."

These recommendations of the Working Party of

the Royal College of Physicians and British Cardiac Society have been ignored by the authorities to whom they were directed. Though many hundreds of prehospital coronary care schemes operate in North America,² little or no attention has been paid in the UK to the emergency care of the coronary patient. The reason for this may relate to the policy of the DHSS.³ That policy dictates that no further mobile coronary care units should be established in the United Kingdom since "no firm evidence has emerged that the use of specially equipped ambulances manned by ambulancemen who have received training in advanced techniques significantly affects the overall mortality rate of patients suffering from acute myocardial infarction". This policy has been instituted despite significant evidence in the United Kingdom from for example Belfast,⁴ and Brighton,⁵ and from the United States.⁶ Using a rapid response system which serves a community of approximately 500 000 people over an area of 90 square miles, Cobb's unit in Seattle (L A Cobb, 1979, personal communication) resuscitated from ventricular fibrillation outside hospital 110 patients in 1977, and 95 patients in 1978, and discharged them home. If the annual heart disease mortality in Cobb's area of Seattle is similar to that quoted by Eisenberg *et al.*⁷ and if recurrence of sudden death in the first year after resuscitation is allowed for, a reduction of 10 per cent in the community mortality in Seattle might be expected.

The policy of the DHSS appears to result from the improper assessment and a misunderstanding of the results of the studies in Bristol⁸ and Nottingham,⁹ both of which it financed. These studies purported to show that patients with myocardial infarction might be treated as successfully at home as in hospital. The earlier study, that carried out in Bristol,⁸ was criticised because of the small number of patients randomised and because patients were randomised late after the

onset of symptoms (median four hours¹⁰). The Nottingham studies have also been criticised. One of these was carried out over a four-year period and covered a population of approximately 100 000.^{9 11} In that area a doctor-manned mobile coronary care unit responded to calls from general practitioners to patients with suspected myocardial infarction. From the expected incidence of myocardial infarction,¹² some 1200 cases would have been anticipated in that population during the four years. Only 150 patients with a definite or probable myocardial infarction, however, were randomised to home or hospital treatment over this period. Thus, of the patients likely to have had a myocardial infarction over the period of study, only one in eight was randomised. From that study, Hill *et al.*⁹ concluded that, "for the majority of patients to whom a general practitioner is called because of suspected infarction, hospital admission confers no clear advantage". Yet Colling and Dellipiani,¹³ without any education of their public, indicated that a general practitioner was called to 50 per cent of cases with a suspected heart attack within an hour of the onset of symptoms in their community. It is of interest that in the Nottingham study⁹ over 40 per cent of the patients with suspected myocardial infarction had contacted their doctor within one hour of the onset of symptoms and nearly 60 per cent within two hours. Nevertheless, the average time from the onset of symptoms to the arrival of the mobile team at the patient was three hours, and a further two hours elapsed before the randomisation was carried out.

In addition, in that study, Hill *et al.*⁹ recorded that during the time between the patient's call for help and the arrival of the team, 14 patients had died, presumably suddenly. A further seven patients developed ventricular fibrillation after the arrival of the team; yet only three out of these survived six weeks. In contrast, 73 per cent of those patients who developed ventricular fibrillation outside hospital after the arrival of the Belfast mobile team survived to leave hospital. It has been made clear that the Nottingham patients, on admission to the coronary care unit, stay under the care of the general physician on duty that day.¹¹ The head of the unit considers his role to be that of an administrator and an educator.¹¹ The junior doctors manning the mobile coronary care unit are drawn from the general medical units of the hospital. This Nottingham experiment⁹ showed no difference in the mortality between those managed at home and those in hospital when patients were seen late after the onset of symptoms. It has been suggested that the addition of a mobile coronary care unit to a hospital coronary care unit will reduce

the cumulative mortality from myocardial infarction over a four-week period by 17 per cent (8% CCU, 9% mobile coronary care unit).¹⁴ As has been confirmed in Nottingham, however, any reduction will be negligible unless early care is extended to the patient and it is both prompt and intensive.

In another Nottingham study, Hampton and Nicholas¹⁵ carried out a randomised trial between a mobile coronary care unit manned by trained ambulancemen and a routine ambulance offering routine care. Pozen¹⁶ commenting on this study stated that, "the one reported attempt at a randomised trial between mobile coronary care and routine ambulance care resulted in a skewed and uninterpretable data set". When the mobile coronary care unit was manned by trained ambulance personnel no patient became a long-term survivor from attempted resuscitation initiated outside hospital. Yet the authors concluded that, "until patients' behaviour patterns change, the only way the mobile coronary care unit concept can usefully be extended in this country is probably by equipping every ambulance that deals with emergencies with a defibrillator and training the crew to use it". Inconsistently a year previously Hampton *et al.*¹⁷ stated that, "it is doubtful whether there would be any significant benefit from training ambulance crews to medical standards of drug administration and intubation".

The poor results of resuscitation from cardiac arrest outside the hospital in Nottingham are to be contrasted with more than 600 patients resuscitated from ventricular fibrillation outside hospital and discharged home in Seattle since 1970.⁶ The Seattle system used trained paramedical personnel. In Brighton, Mackintosh *et al.*⁵ reported that 40 patients were resuscitated from ventricular fibrillation outside hospital and were discharged home over a three-year period. Resuscitation was carried out by trained ambulance personnel.

The major question to be answered is not whether patients with coronary attacks should be managed at home or in hospital, but how the early high mortality from ventricular fibrillation can be reduced. Reduction in delay between the onset of symptoms and the call for help is clearly imperative. In order that this delay is reduced to a minimum, constant education of the public regarding the symptoms of the coronary attack is essential. It is also important that the public should receive training in cardiopulmonary resuscitation.⁶ These educational programmes, however, must be supported by an emergency care system which delivers trained personnel and equipment rapidly to the scene. If such a system is not available patients will not call for help within the early minutes of the attack.

Mobile coronary care units manned by doctors or paramedical personnel have successfully resuscitated 8 to 44 per cent of patients from ventricular fibrillation outside hospital.^{4 18 19} These figures, however, are still small. In order to increase these to 50 per cent or more, the equipment and trained personnel must be readily available where the patient collapses.

It has been estimated that the expected incidence of acute myocardial ischaemic attacks (including sudden deaths) is one or two cases per day per hundred thousand of the population.²⁰ In several areas throughout the United Kingdom interested general practitioners have for several years encouraged their patients to call for help immediately after the onset of symptoms. They have arranged that there is the minimum of delay between the time of the call for help and the arrival of a doctor with the patient²¹ (and L C Cowley, 1979, personal communication). Several Health Centres are now fully equipped with a simple defibrillator and monitoring oscilloscope and the drugs required for the correction of arrhythmias. If defibrillators can be developed which sense ventricular fibrillation on paddle contact with the chest and only discharge a shock when ventricular fibrillation is present, then these instruments might even be available in homes of patients at risk, to be used by trained members of their family.

Summary and conclusions

While the negative attitude of the DHSS towards emergency coronary care in the UK continues, some 30 000 deaths from coronary artery disease occur annually outside hospital. The majority of premature deaths occur in middle-aged men of economic importance to the country and to their families. Coronary heart disease is the major cause of death in the Western world. The majority of deaths are sudden and result from ventricular fibrillation. Correction of ventricular fibrillation outside hospital is a practicable proposition. If the Seattle results were extrapolated to the UK, and allowing for the saving of lives in rural areas by trained general practitioners, then some 7500 lives might be saved annually in Great Britain.

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